

Geostatistics Fall_2021

Homework 2

1. A homogeneous and isotropic gamma random field has the following properties:

$$f_X(x) = \frac{\lambda^\alpha}{\Gamma(\alpha)} x^{\alpha-1} e^{-\lambda x}, \quad \alpha, \lambda > 0 \text{ and } 0 \leq x < +\infty.$$

with $\alpha = 0.449, \lambda = 0.67$. The semivariogram of the random field can be expressed by

$$\gamma(h) = \varpi \left[1 - \exp\left(-\frac{3h}{a}\right) \right], a = 3.$$

- (1) Generate 100 realizations of the above random field using grid interval $\Delta=1$. Each realization should be 40 x 40 pixels in size.
- (2) Show images of three realizations.
- (3) Validate your simulation results.